

THE Chemical Age

OL. LXXIV

2 JUNE 1956

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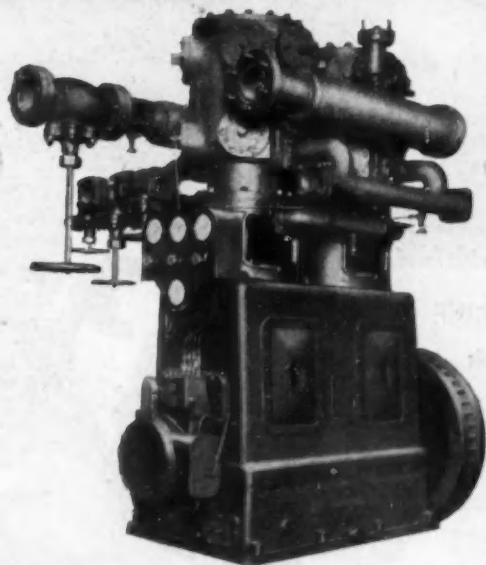
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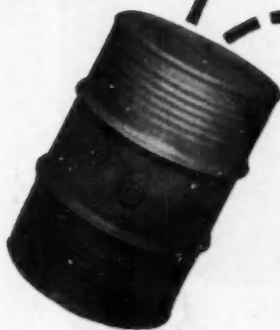
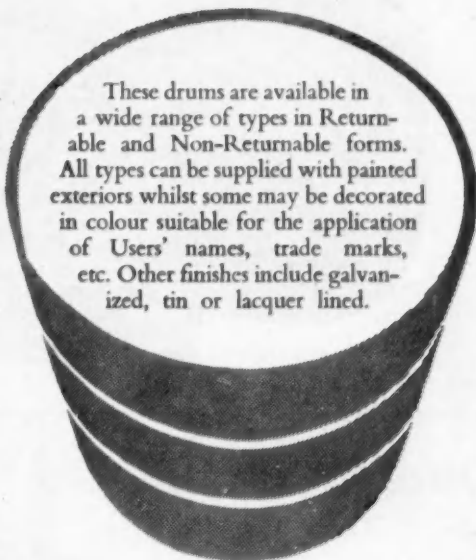
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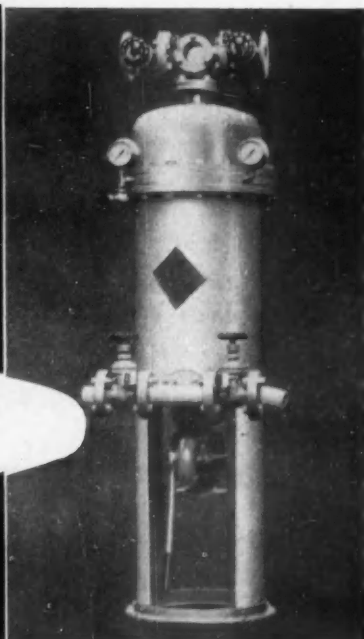
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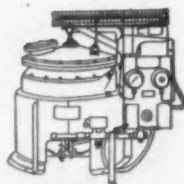
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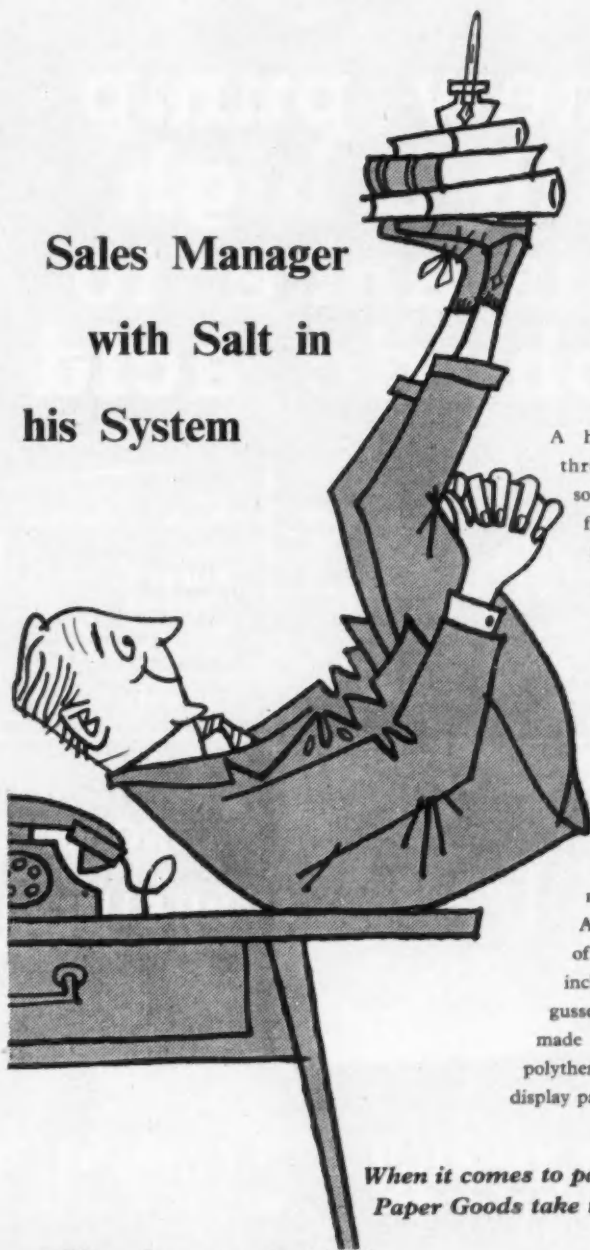
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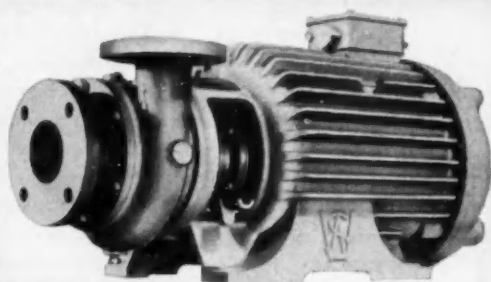
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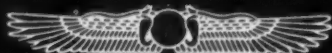
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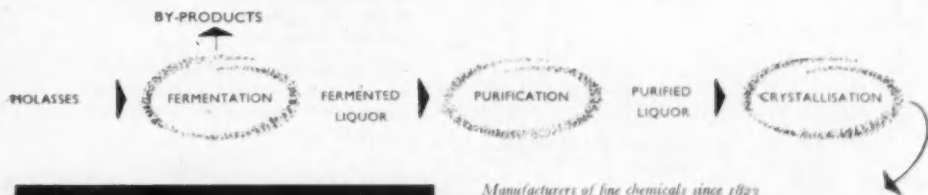
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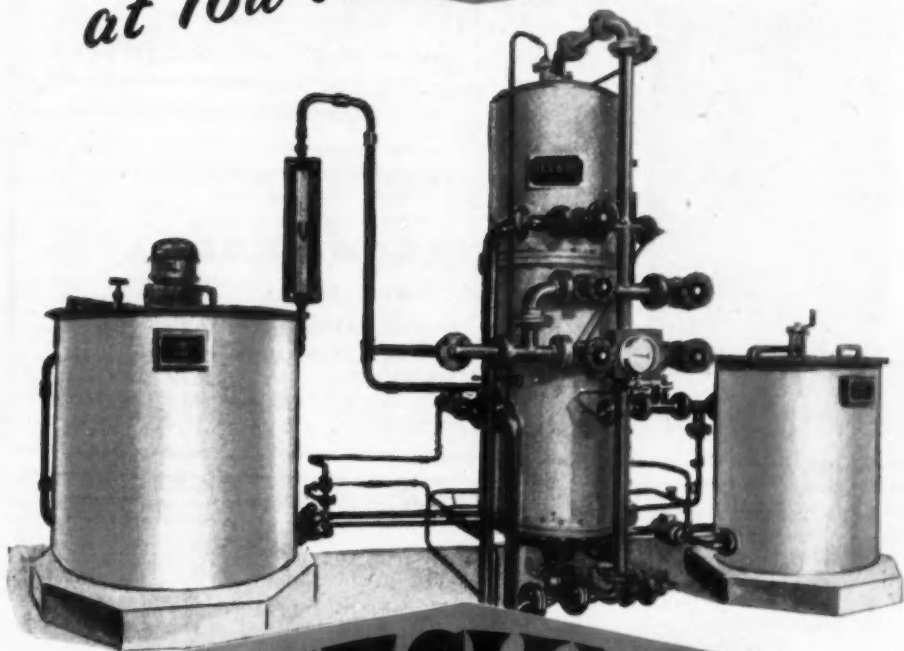
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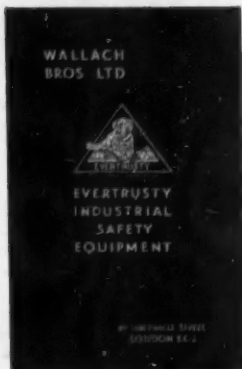
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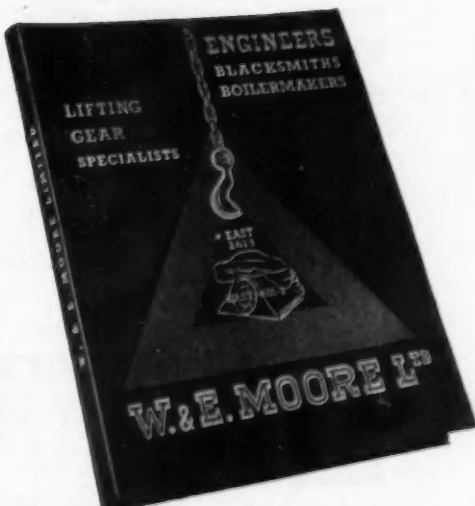
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Size & Power

PROBABLY the two greatest industrial and commercial organizations intimately associated with this country are Imperial Chemical Industries and Unilever. At the present time each company has been making its annual report for 1955. Great power and great size in industry have many opponents, theoretical and political, and the mere fact that these huge organizations pass year by year from one phase of expansion to the next will not remove any of the venom with which they are attacked. In critics' eyes success is the inevitable by-product of monopoly, and even though monopoly does not exist in most fields and has no more than passing technical existence in a few, this piece of superficial argument contemptuously dismisses great national records of achievement without which this country would have much closer acquaintance with crisis and disaster. However, to state the opposite, true though it may be, is no answer to these sweeping generalizations that steadily emanate from the ultra-left. The surest answers are particularized and factual—accounts of these big companies' methods and plans, clearly and patiently presented so that all fair-minded men can judge for themselves whether great power is being used or abused.

In their new reports both companies devote considerable attention to the problems of personnel, management, and recruitment. Here, surely, is one way by which desirable and undesirable activity may be distinguished. It is an ancient cry of the left that giant structures in industry lead to hard conditions of employment. Yet Imperial Chemical

Industries is able to report that by the end of 1955 its staff and pay-roll included 41 people with over 50 years' service, 1,890 with over 40 years', 8,333 with over 30 years', and 22,685 with more than 20 years' service. Bonus payments in 1955, for which over 81,000 employees qualified, amounted to a total sum of £2,691,390, or £2,047,125 after deduction of personal income tax. This sum was spent in acquiring and issuing 743,426 ordinary shares of £1 each. A saving scheme operated by deductions from pay is run by ICI Savings Bank Ltd., and at the end of 1955 employees had accounts totalling £1,750,000. It is said that much thought has been given recently to schemes 'to encourage employees to increase their interest in the company by acquiring preference and ordinary shares from their personal savings, independently of the employees' profit-sharing scheme.' However, experiments in this direction have been deferred until more experience of the profit-sharing bonus scheme has been gained. Here, assuredly, is no empire of human exploitation. Instead, the most commendable efforts are being made to bring capital and labour, or ownership and work, closer together in fact and outlook, and theoretical socialism is being outpaced by practical and social enterprise.

Nor is this all. Cynics may still argue that in present conditions it pays any company, large or miniature, to look after its workers, and that these disbursements of ownership still leave the major trend of exploitation-by-a-few mainly intact. At the end of 1955 the average holding of preference stock was £529 with

63,720 holders, and of ordinary stock £716 with 198,177 holders. Many holders were pension funds, insurance companies etc., in turn representing a large number of people all of whom derive indirect benefit through the progress of the company. For evidence of monopoly powers and decisions taken by a few and settling the fates of many, ultra-left campaigners should indeed look elsewhere.

Perhaps, however, the consumers of this vast company's goods, or the nation as an economic whole, pay the real bill for super-size and super-power? For there can be no other sufferers if workers are in fact prospering, and if ownership is so widely and beneficially spread. This possibility is utterly refuted by data in the ICI report:

Year	Total Wages & Salaries		Wages & Salaries per unit of output	
	All Industry	ICI	All Industry	ICI
1948	100	100	100	100
1951	125	137	107	96
1953	144	154	119	105
1954	156	173	121	100
1955	†	193	†	99

† Not available.

These are selected figures from a more fully presented tabulation. They show that although more money has been paid in salaries and wages, better value in production has been consistently obtained; and that these changes have always been taking place at a better rate than that of all British industry, or in contrast to changes in a reverse direction. Furthermore, where national output for all industry has risen from an index of 100 in 1948 to 136 in 1955, the ICI output has risen from a 1948 level of 100 to one of 195 in 1955.

Yet there is still a vocal demand for the nationalization of ICI from some sectors of the political left's patchwork quilt. What such a transformation would achieve for the betterment of man's lot must be either mythical or mystical for, as has been clearly demonstrated, an enormous number of people—employees, staff, investors, pensioners, consumers, and the nation as a whole—are all enjoying the benefits of private management and normal commercial control.

Lord Heyworth devoted most of his address at the Unilever general meeting to 'things to which a money value cannot be attached . . . the human side of the business, the people who make the wheels

go round . . .'. Specifically, since this today constitutes one of industry's major problems, he dealt with managers. In Unilever out of a total labour force of some 270,000, there are 22,600 managers. 'The only test which we apply to determine a man's suitability to enter our managerial ranks is that of merit. There is no question of demanding a particular social or educational background. . . .

We try to see that in our business there is always a ladder by which a man with the right qualities can climb to the next stage.' Nevertheless, the bulk of external candidates for managerial posts are university-educated young men in their 20s, and internal training starts 'on the job' or 'in a job' through which the trainee begins to learn the art of being a manager. Training-courses reinforce this individual system, and there are courses for all stages of managerial advancement. In addition to training courses, working conferences attended by 20 to 100 managers are often held for intensively studying questions of general interest; also, when a special problem of policy or construction has arisen, a panel of managers is frequently set up to investigate it and report to the company.

But despite this well-developed system for training and up-grading managers and for bringing managerial problems and opinions together, Lord Heyworth insisted that management is fundamentally learnt on the job, and the key influence in fostering the art of management is delegation. Delegation of responsibilities to a subordinate (and potential manager of the future) must be an act of trust. 'It does not come naturally to most people . . . but in general the greater the scope which every manager can give to those below him, the better.'

Here, then, though expressed in a quite different context, is evidence that giant-sized industry and commerce is not the product or pursuit of a few, but depends entirely upon many. It could be said that this is no less true of the nationalized industries which have become giants by legislation rather than evolution. But it is not irrelevant that the giants of enterprise are striving to evade the perils and pitfalls of centralized authority and centralized decisions, while in nationalized undertakings these inherent weaknesses have yet to be clearly recognized.

Notes & Comments

Fire & Chemicals

AS usual, the annual report (1955) for the Fire Research Board (HMSO, 4s) contains some interesting chemical or chemically-connected items. The development of static electricity charges through the rubbing of synthetic textiles can create hazardous conditions when, say, oil tanks or aircraft are being refuelled, or during operations in hospitals. Pairs of wool, Terylene, nylon, and pvc sheet have been found to give high charge densities with static energies 10,000 times that of cotton rubbed with cotton. Woodworm insecticides have been examined for their flammable hazards; the solvents used in making these products are usually combustible and applied liberally, and it seems somewhat uncertain how long after treatment treated wood remains readily ignitable. An extension of the use of dry chemicals as fire extinguishers is being investigated. An old method, it is now being studied for use in dealing with large fires or crashed plane fires. So far the chemical used in tests has been sodium bicarbonate, the veteran of this field. Further research on 'the value of adding 'wetting agents' to water used in fire-fighting has not advanced these chemicals' claims here, despite evidence for their usefulness in other countries. The conclusion reached is that although wetting agents increase water's fire-extinguishing effectiveness in some types of fire, this is not a common advantage.

Chemical Exports

IN making further comment upon recent chemical company reports, we may perhaps risk the charge of monotony, but the vital importance of export sales seems to justify this extra attention. Exports sales of Imperial Chemical Industries Ltd. (from the UK) rose from £67,500,000 in 1954 to £71,100,000 in 1955. This is an advance of 5.3 per cent; also, it represents 17 per cent of the whole of ICI's annual sales. These figures can be compared with those in the report of Monsanto Chemicals

Ltd.; export sales in 1955 rose also by 5 per cent to a total of £5,056,533, but this represented 37 per cent of total sales income. The second part of this comparison is misleading, for the total sales figure given by ICI includes sales by subsidiaries in other countries, e.g., by Canadian subsidiaries. The similarity of the rise in export sales value over 1954 for both companies is perhaps a hopeful sign that British chemical exports are generally showing this amount of expansion. Moreover, it is a genuine expansion due to increase in volume and is not the more mathematical product of price rises. In the ICI report it is stated that average export prices were relatively stable throughout the year. The main markets producing increased sales were the US, South Africa, Australia, the Near East, West Africa, and the Caribbean. Attention is drawn to factors that tend to inhibit export trade—'documentation' even for minor transactions is formidable, and flag discrimination for freight transport is spreading and even bringing with it similar demands for effecting insurance. 'All these practices slow down trade and increase the cost of goods to the customer overseas.'

Bromination for Fungicides?

THAT halogenation sharply increases the insecticidal properties of various organic substances is well enough known, and now an interesting communication from India (G. N. Mahapatra, *Nature*, 1956, [177] 938) casts bromine for a similar role in synthesizing organic fungicides. The new studies have arisen from work on 2-amino-4-aryl-thiazoles. As these possess the nitrogen-carbon-sulphur cyclic grouping found in other fungicidal molecules, their capacity to reduce spore germination was tested. Seventeen different 2-amino-4-aryl-thiazoles were then brominated so that bromine entered position 5 of the thiazole nucleus, and the fungicidal and anti-bacterial properties of these derivatives were then compared (by laboratory tests) with those of the parent chemicals. Where without bromination 90 ppm were

required to inhibit spore germination, some of the brominated derivatives completely inhibited germination at 20 to 22 ppm. Similarly, in some cases the introduction of bromine into the thiazole nucleus raised anti-bacterial power by 100 to 150 per cent, activity at a strength of 1:8,000 being converted into activity at strengths of 1:20,000 and 1:15,000. Whether this research *in vitro* can lead to practical development must be deemed somewhat speculative. At any rate in protecting living matter from fungal attacks, chlorinated substances would seem preferable to brominated relatives; for even if chlorine is not wholly desirable as a residue, it is more assimilable than bromine. Also a bromination process must be more costly than chlorination. However, every advance in fungicide synthesis is potentially valuable for, so far, the development of organic fungicides has lagged sadly behind that of organic insecticides.

'Garden of England'

SOMETHING in the nature of an international move has taken place as a result of the establishment at Woodstock in Kent of all the agricultural research on this side of the Atlantic by the Royal Dutch/Shell group of companies. Before 1954, responsibility for this research was divided between Woodstock and the group's laboratories in Amsterdam. Now that consolidation has taken place, many of the present research staff have come over from Holland to make their homes in Britain and to take up work at Woodstock. All will wish them well. Quite apart from the valuable contribution which the Dutch scientists will make to the research programme, they will be here as friends and representatives of a nation with which the United Kingdom has had long and cordial relations. There can be no doubt about the importance of the work which agricultural chemists everywhere are doing to conserve mankind's food supply; neither can there be doubt about the size of the task. In Britain alone, crops are lost to the estimated value of £100,000,000 a year, the equivalent of 2,000,000 acres, by pests and diseases. It has been estimated that insects and pests absorb the astonishing proportion of

one-third of all the crops grown by man. The contribution which Woodstock, and other research laboratories all over the world, are making to the betterment of mankind is truly international and will gain much from the links which are being forged between British and Dutch scientists working, appropriately enough, in the 'Garden of England'.

Harrison Memorial Fund

Applications to be Considered

THE Selection Committee of the Harrison Memorial Fund announces that it will consider making an award of the Harrison Memorial Prize after 1 December 1956.

The prize, not exceeding 100 guineas, will be awarded to the chemist of either sex, being a natural-born British subject and not at the time over 30 years of age, who, in the opinion of the selection committee, 'shall, during the previous five years, have conducted the most meritorious and promising original investigations in chemistry and published the results of those investigations in a scientific periodical or periodicals.'

Applications, five copies of which must be submitted, should give the name of the applicant in full; age (birth certificate should accompany the application); degrees (with name of university); any other qualifications and experience; titles of published papers (with co-authors' names) including full references to publication; where research was carried out; testimonials and references, and any other particulars bearing on the application.

The selection committee is prepared to consider applications, nominations, or information as to candidates eligible for the prize. These should be addressed to the president, The Chemical Society, Burlington House, Piccadilly, London W1, to arrive not later than 1 December 1956.

Bradford Office Moves

The Export Credits Guarantee Department (the Government Department providing exporters with insurance against the major risks of export trading) announces that its Bradford office will take over new premises at Britannia House, Bridge Street, Bradford 1 (Bradford 25147), on Monday, 28 May 1956. This office covers West and South Yorkshire: for the last 25 years it has been at 69 Market Street, Bradford.

Swiss Chemical Industry

Large Subsidiary Organizations Overseas

WRITING in *Foreign Trade*, a publication of the Department of Trade and Commerce, Ottawa, Canada, N. W. Boyd, Assistant Commercial Secretary, Berne, says that the Swiss chemical industry accounts for about 16½ per cent of total Swiss exports, with emphasis on high quality proprietary products. This is despite the fact that virtually all raw materials have to be imported.

In addition, the Swiss chemical industry has a world-wide network of well-established subsidiary companies which add substantially to its invisible balance-of-payments returns.

Beginnings of the Industry

'The beginnings of the Swiss chemical industry,' says Mr. Boyd, 'are closely linked with the textile and especially the silk ribbon industry in and around the Rhine port city of Basle. The first important production sector, which is still the leader, was dyestuffs, which were first made between 1860 and 1870. Other major groups are industrial chemicals, pharmaceuticals, vitamins and dietetic food specialities, textile auxiliaries, insecticides and fungicides, synthetic perfumes and cosmetics, and, more recently, plastics and synthetic fibres.'

The writer goes on to say that Switzerland is an important market for a range of imported chemical products; chemical imports total more than \$100 million a year. Primarily these consist of heavy chemicals, those based on coal tar, and petrochemicals, but they extend into the more highly manufactured field.

The total labour force employed in the Swiss chemical industry is about 25,000 and the greater part of the industry is situated in Basle or nearby. This applies particularly to the dyestuffs industry.

The production of industrial chemicals has been concentrated on fine products which do not depend too much on direct raw material sources. Switzerland has one cheap source of power, hydro-electricity, and certain electrochemicals are widely made.

Pharmaceutical specialities and drugs are perhaps, with dyestuffs, the principal pillars

of Switzerland's chemical structure, and in most cases the same firms work in the same sector. With the exception of one company in Berne, the majority of this industry is again located in and around Basle.

Switzerland's insecticides and fungicides industry, which dates from between the two wars, developed rapidly in conjunction with the intensive cultivation of Swiss farm land and the high degree of chemical research.

Three quarters to four fifths of Swiss chemical production was exported said Mr. Boyd, and these exports had made consistent progress during the past 10 years, reaching a value of S.fr. 927,600,000 in 1955. Principal markets were West Germany, France, Italy, the United States, the United Kingdom and BLEU.

'For many reasons,' says Mr. Boyd, 'the Swiss chemical industry has developed subsidiary organizations throughout the world. The process of establishing branch production facilities was accelerated after 1920 and again during the past 10 years to the point at which manufacture abroad by Swiss interests is estimated to employ a labour force of about 50,000—twice that employed in Switzerland. There are approximately 120 foreign affiliated production firms, 20 fairly large ones are in the US. Estimates place the turnover of these latter subsidiaries at between \$160 million and \$170 million a year, with pharmaceuticals in the lead.'

Nitrogen in Photography

AN inexpensive and effective way of keeping photographic developing solutions moving by the use of nitrogen has been discovered by Mr. W. A. Moss of Spesco Developments Ltd. He found that the solution could be kept moving if a regular flow of nitrogen was injected into the tank. Nitrogen also helps to overcome the problem of oxidation of the solution.

Nitrogen is introduced into the solution from a cylinder by means of a plastic tube. The nitrogen causes the solution to rotate in the tank and the flow of gas is controlled by a regulator. This is particularly important when a wetting compound is used in the solution.

Chemical Exports for April

Australia Now the Principal Buyer

THE total value of British chemical exports in April dropped slightly to £20,140,621 from £20,367,578 in March. Australia has now overtaken India as the principal buyer, spending £1,807,179 in April, compared with India's £1,574,716. Total exports of elements and compounds continued their downward trend, dropping to £4,992,857 in April from £5,127,056 in March and £5,190,396 in February. Exports of synthetic dyestuffs increased to 18,490 cwt. in April, from 16,371 cwt. in March. This compares with total exports of 15,627 cwt. a year ago.

EXPORTS: PRINCIPAL COMMODITIES

	April 1956	Mar. 1956	April 1955
Acids, inorganic (cwt.)	15,765	15,781	13,599
Copper sulphate (tons)	7,007	3,423	1,737
Sodium hydroxide (cwt.)	370,974	630,148	269,331
Aluminium oxide (tons)	1,483	1,149	2,076
Aluminium sulphate (tons)	2,933	3,262	1,044
Ammonia (cwt.)	7,965	9,201	10,586
Bismuth compounds (lb.)	19,143	19,259	32,615
Bleaching powder (cwt.)	30,420	34,642	23,516
Hydrosulphite (cwt.)	5,066	4,571	7,164
Calcium compounds inorganic (cwt.)	34,147	23,527	26,772
Lead compounds inorganic (cwt.)	4,314	3,040	6,851
Magnesium compounds (tons)	1,424	1,142	955
Nickel salts (cwt.)	6,335	6,478	5,330
Potassium compounds (cwt.)	7,124	3,398	2,835
Acids, organic & derivatives (value in £s)	125,909	87,982	80,858
Ethyl, methyl, etc., alcohols (value in £s)	114,121	93,492	102,522
Acetone (cwt.)	13,446	8,434	22,855
Citric acid (cwt.)	2,565	3,073	3,446
Sulphonamides unprepared (lb.)	143,181	338,425	94,421
Dyestuffs intermediates (lb.)	5,325	7,769	4,246
Total for elements & compounds in £s	4,992,857	5,127,056	3,981,339
Coal tar (tons)	19,101	4,963	7,958
Cresylic acid (gal.)	195,619	267,223	198,697
Creosote oil (gal.)	2,016,165	1,069,316	1,968,664
Total for tar products in £s	484,343	309,125	322,214
Total for synthetic dyestuffs (cwt.)	18,490	16,371	15,627
Total for paints, pigments & tannins in £s	1,816,434	1,944,497	1,670,935

Total for medicinal & pharmaceutical products in £s	2,637,253	3,199,391	2,908,068
Total for essential oils, perfumes, etc. in £s	2,140,171	2,367,004	2,125,680
Ammonium nitrate (tons)	282	709	542
Ammonium sulphate (tons)	853	1,648	5,740
Total for all fertilizers in £s	45,503	99,264	185,027
Total for plastics materials (cwt.)	150,912	157,442	146,444
Disinfectants etc. (cwt.)	16,200	12,859	17,045
Insecticides, fungicides & rodenticides (cwt.)	22,823	36,321	37,297
Weedkillers (cwt.)	12,424	7,142	13,270
Lead tetra-ethyl (gal.)	390,587	327,315	555,802

VALUE OF EXPORTS IN £s: PRINCIPAL BUYERS OF CHEMICALS

	April 1956	Mar. 1956	April 1955
Australia	1,807,179	1,314,104	1,555,232
India	1,574,716	1,719,046	1,289,024
South Africa	1,089,243	1,051,078	1,228,027
Netherlands	655,635	814,483	588,395
United States	644,270	778,818	678,533
Sweden	594,181	604,580	569,481
Italy	583,915	706,981	413,786
France	549,500	597,939	703,578
New Zealand	546,739	466,875	721,042
Eire	519,889	516,076	528,502
West Germany	509,259	546,609	350,628
Canada	478,279	629,761	478,279
Nigeria	448,004	481,057	440,537
Singapore	432,466	323,914	292,078
Belgium	409,816	449,948	434,477
Egypt	366,340	474,831	218,702
Hong Kong	325,291	275,826	286,471
Norway	319,249	315,711	272,458
Denmark	314,874	406,521	334,814
Malaya	302,139	294,078	272,519
Gold Coast	294,611	469,211	338,334
Finland	262,901	277,306	262,869
Switzerland	237,443	366,031	248,280
Pakistan	233,375	224,595	233,375
Argentina	206,726	295,814	291,510
Jamaica	201,140	301,716	236,274
Turkey	198,104	217,648	171,616
Netherlands Antilles	191,499	306,648	490,750
Indonesia	158,495	298,353	294,927
Burma	135,380	213,220	172,382
Iraq	125,150	225,517	217,050

Total value of chemical exports	20,140,621	20,367,578	18,767,427
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New Home for Johnsons Wax Products

A factory and offices, including research and chemical laboratories, will be built by Johnsons Wax Products at Manor Farm, Frimley Green, Surrey, at a cost of £500,000. Construction will start in nine months' time and should be completed early in 1958.

Ultramicro-Determination of Zinc

by MELLES A. LACOURT & P. HEYNDRYCKX

(Department of Microchemistry, Brussels University)

THERE is a growing demand from research centres interested in the effect of trace and biogenic elements for precise, rapid and reproducible methods of ultramicro-determinations. One is at a loss when it comes to determine amounts of the order of micrograms or less, which are about the quantities dealt with in these researches.

Our proposed technique is general; it measures light absorption through a coloured zinc-dithizone spot formed on Whatman

The zinc-dithizone complex absorption curve has a maximum around 520 m μ . When formed on paper, the same maximum is observed, but the optical density (OD) units measured, then, on any amount of complex, involve the absorption by the complex itself, that by the supporting paper, and that by the reagent (dithizone) sprayed to form the complex. The last two quantities together represent with great reproducibility 0.010 units of OD. This means that the standard blank is so reproducible that one can rely on one blank per series of determinations and set the Beckman on this blank at zero of optical density. Complex measurements occur then, by reference to this blank, and the OD units read on the Beckman express the zinc concentration read on the calibration graph (Fig. 1). This graph is drawn at 520 m μ , with a slit of 0.28 mm. and using a tungsten lamp, red phototube, one centimetre cell, nine millimetre calibrated glass cell spacer, and a dithizone concentration in carbon tetrachloride of 15 mg per 100 g. of solvent.

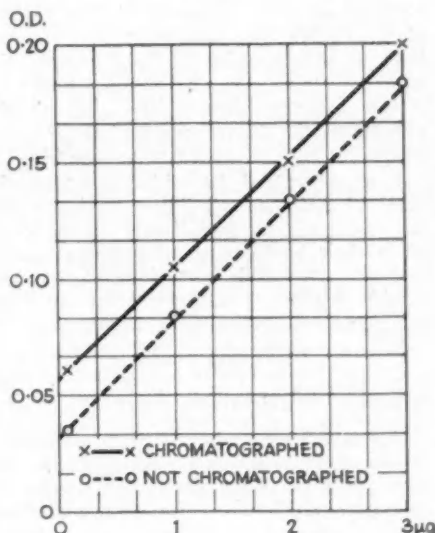
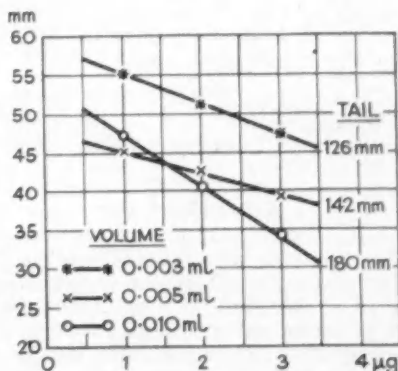


Fig. 1 (above) Calibration graph. Spectrophotometry on paper of zinc-dithizone. Fig. II (right) Influence of solution volume on spot position

filter paper No. 4. Absolute quantities of zinc from 0.1 to 3 micrograms are determined with a reproducibility varying from 0.29 to 0.09 per cent. The spot is measured where it is deposited; it involves therefore no dilution nor elution, a minimum of handling, and can be measured from a zinc solution or from a chromatographic spot of zinc separated from other elements.

Fixing the Paper

The spotted paper (1cm x 1cm) is fixed between cell wall and cell spacer, so as to present the complex coloured area, right in front of the cell window. Water helps trans-



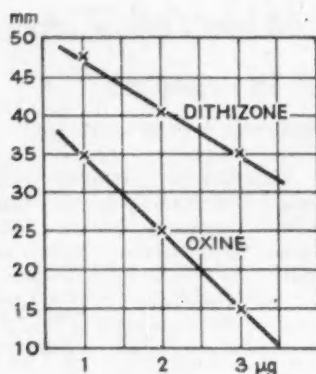


Fig III. Influence of concentration on spot dimensions

mission of light; air bubbles should all be expelled.

Values for non-chromatographed spots of zinc-dithizone

	3 µg	2 µg	1 µg	0.1 µg
OD units	0.1850	0.1351	0.0855	0.0411
Values for chromatographed spots of zinc-dithizone (M/18)				
OD units	0.2004	0.1532	0.1055	0.0606

The favourable effect of chromatography (1) on the results has to be noted; it affects the values as well as the reproducibility which passes from 0.68 to 0.29 per cent when chromatographed (3 µg). We will investigate lower quantities than 0.1 µg as it is presumable that this is not the limit of sensitivity of this technique. When zinc is accompanied by other elements, chromatography should be carried out according to our standardization conditions (2) in 45 minutes. When zinc is the only element to be determined, a better shaped chromatographic spot is obtained on paper conditioned with 76 per cent humidity. A smaller spot is obtained by reducing the volume of solution deposited, according to the diagrams (Figs. II and III).

REFERENCES

- (1) A. Lacourt & P. Heyndryckx: *Mikrochimica Acta*, 1956, 7-8, 12 11.
- (2) A. Lacourt & P. Heyndryckx: *Microchimica Acta*, 1954, 6, 630.

Consolidated Zinc

The seventh annual general meeting of The Consolidated Zinc Corporation Ltd. will be held at 37 Dover Street, London W1, on Monday, 18 June at 12 o'clock. Profit for the year ended 31 December 1955 amounted to £6,186,534, an increase of £722,814 over the previous year.

Appeal with Costs

AN appeal by Evans Medical Supplies was allowed, with costs, by Mr. Justice Upjohn in the Chancery Division on 18 May in a reserved judgment. The appeal was against a finding by the Special Tax Commissioners that £100,000, received by the company from the Burmese Government for assisting in the establishment of a pharmaceutical industry in Burma, was taxable as income.

Mr. Justice Upjohn held that the sum was a capital payment and remitted the matter to the Commissioners for them to adjust the figures of assessment on that footing.

He said that the company carried on business in Burma through its agents. He did not see how the receipt of £100,000 under the agreement could be part of the profits or gains of the company as wholesale druggists. Under the agreement they entered into a new activity as advisors to the Burmese Government by assisting to set up a new industry there. This involved disclosure to the Government of secrets that had never been disclosed to anyone else.

It also involved, he said, a great curtailment of their own wholesale trading activities there. They had liberty to carry on there their business as wholesale druggists and also the selling of their products made in this country or elsewhere, but the company were dissipating their assets.

Smoke Abatement Report

THE annual report of the National Smoke Abatement Society is included in the society's Year Book for 1956, which has just been published. The year book contains a general information and reference section, a list of recent papers and reports on air pollution, a guide to publications and a directory of organizations concerned with problems of smoke abatement and fuel efficiency. There are a number of useful new features, including a comprehensive synopsis for use by lecturers, speakers, and students, entitled 'The Clean Air Case', and a concise 'History of Air Pollution in Great Britain'. Other features include a summary of the work of the Fuel Research Organization of the DSIR, statistics of atmospheric pollution, an account of the National Industrial Fuel Efficiency Service, and a summary of the present legal position.

A Review of Organic Phosphorus Insecticides

VI Parts—Part IIIa: Problems of Separation

by R. G. BARRADAS, B.Sc., A.R.I.C., A.R.T.C., M.R.S.H.
(Government Laboratory, Hong Kong)

THE problem of the chemical separation of the various constituents of organic phosphorus insecticides, their respective isomers, and impurities generally, presents a strong challenge to the modern analytical chemist. The application of chromatographic techniques to analysis has provided solutions to many of the difficulties encountered by the chemist in the almost unlimited field of organic chemistry. Chromatography possesses decided advantages over conventional and classical analytical methods. Its widespread popularity is sufficient proof of its success. Chromatographic methods for the analysis of organic phosphorus insecticides have only made their mark in the literature over the past two years, but this is not very surprising in view of the fact that organic phosphorus compounds were not introduced as insecticides until the last decade or so.

Determination of Parathion

Pfeil and Goldbach (31) developed a method for the determination of parathion in biological materials, which was based upon hydrolysis to *p*-nitrophenol by treatment with alkali and the subsequent identification of this compound using a paper electro-phoretic method. The material under test was first homogenized and extracted with ether. The extract was chromatographed on paper with a mixture of ethyl alcohol, ammonia and water in the proportions of 80:4:16, R_f values obtained were:—

<i>p</i> -nitrophenol	0.71
<i>o</i> -nitrophenol	0.69
dinitrophenol	0.74
naphthol yellow S	0.45

The ultra-violet absorptions of the eluates from the chromatogram were then determined. The authors claimed that the quantitative determination of *p*-nitrophenol would thus be equivalent to the parathion present in the original sample. A paper

chromatographic separation of three contact insecticides, namely DDT, parathion, and benzene hexachloride (BHC) was reported by Gruch (32). The test mixture was dissolved in acetone and transferred to a Schleicher and Schüll paper No. 2043-b, which was impregnated with ether containing two per cent of petrolatum. Gruch employed start lines of 10 cm. length.

An ascending chromatography technique was used, the developing solvent consisting of a mixture of ethyl alcohol, water and concentrated ammonia solution in the ratio of 80:15:5. Gruch employed a biological method for the identification of the separated constituents of the test material. The strips of paper were cut into segments and each segment was eluted with water and examined for the type of insecticide by the addition of three day's old larvae of *Aedes aegypti* to the eluate, R_f values found were:—

DDT	0.63
BHC	0.87
parathion	0.95

Reliable results were obtained using a five milligramme mixture of the three insecticides. Where this mixture contained free *p*-nitrophenol as an impurity, a characteristic yellow band with an R_f value of 0.80 was noted on moist paper. This band fluoresced in ultra-violet light when dry.

Chromatography

Much valuable literature on the chromatography of organic phosphorus insecticides was contributed by Cook working in America. In his first paper (33), he developed new spot tests for the successful detection of technical Systox, parathion, methyl parathion, Chlorothion, malathion, EPN, and Diazinon. Paper chromatograms were sprayed with an approximately 0.002 M solution of N-bromosuccinimide in methyl-chloroform, dried, and then resprayed with a slightly alkaline approximately 0.0003 M solution of fluorescein in alcohol.

Bromine available from the brominating agent *N*-bromosuccinimide was absorbed by the insecticide, and the unabsorbed bromine was converted into bromofluorescein by the second spray with the alkaline solution of fluorescein. A spot was revealed by the unchanged yellow-green fluorescence of the fluorescein against the pink background of brominated fluorescein. The location of the spot indicated the presence of the insecticide. This method was developed mainly for Systox, but the technique was found to be applicable to sulphur-containing organic phosphorus insecticides. In his second paper (34) published in the same series, Cook discussed the separation and identification of organic phosphorus insecticides. He used the reverse-phase chromatographic technique for the separation. The stationary phase consisted of mineral oil, and the mobile phase was a mixture of ethyl alcohol, acetone, and water in the ratio of 1:1:2. The observed R_f values were:—

Systox (unknown component)	0.10
Systox isomer	0.47
Isosystox isomer	0.99
EPN	0.35
parathion	0.52
Diazinon	0.61
Chlorothion	0.70
methyl parathion	0.85
malathion	0.93

In view of the fact that these R_f values varied with the amount of oil on the paper, standards were run concurrently with unknowns. It is interesting to note that Systox, being a systemic insecticide, is a compound whose isomers are not recoverable as such from sprayed plant tissues. The metabolite which is 'recoverable' does not respond to Cook's spot test.

Effect of Light

In the concluding article of this series of three papers, Cook (35) discussed the effect of light on Systox and Isosystox. When these two insecticides were placed on paper and irradiated for about two hours (sunlight, fluorescent light, or ultra-violet light) the chromatographic behaviour of both isomers was changed. Parathion, EPN, methyl parathion, Chlorothion, malathion, and Diazinon did not give new spots under the same conditions. The Systox isomer showed up as a new spot (R_f 0.8-0.9) which was detected by the fluorescein test. How-

ever, the Isosystox did not respond to the test, but it did develop a zone possessing marked cholinesterase inhibition at about the same R_f . Cook suggested that air was instrumental in the conversion by radiation because the new and more water-soluble products were not formed by exposure of the isomers in ether solution.

Silicone-Impregnated Paper

March, Metcalf and Fukuto (36) used a silicone-impregnated paper for the separation of demeton from its thiol isomer and its main plant metabolites. A mixture of chloroform, ethyl alcohol, and water in the volumetric ratio of 10:10:6 was used as solvent. A propylene glycol-impregnated paper and a solvent mixture of petrol and toluene in the volumetric ratio of 4:1 and saturated with propylene glycol could be used alternatively.

For the separation of Schradan from its related phosphoramidate esters, March and his co-workers used chromatographic paper treated with a mixture of equal volumes of benzotrichloride, carbon tetrachloride and toluene, saturated with propylene glycol. The concentration of propylene glycol was found to be critical. Schradan was revealed on the chromatogram by spraying with a mixture of perchloric acid, ammonium molybdate, hydrochloric acid and water. The paper was then heated at 80°C for two minutes and exposed to ultra-violet light (365 mμ) for 15 to 30 minutes. The more easily hydrolysed compounds gave blue spots very quickly, the others within 24 hours. All the spots were not definitely identified. With demeton the technique was less satisfactory, since the colours took 24 to 72 hours to develop. If the compounds were labelled with ^{32}P or ^{35}S , then location by autoradiography or by counting along the strip was satisfactory.

Pfeil (37) employed a chromatographic column technique for the detection of parathion in viscera. The stomach contents were acidified with tartaric acid, extracted with alcohol and vacuum-dried. The dried extract was taken up in benzene and passed through an alumina column moistened with benzene. When parathion was present, a yellow ring formed at the top margin of the column and coloured impurities were shown up at the lower sections of the column. The yellow zone was removed mechanically, treated with dilute hydrochloric acid, and

extracted with ether. The extract, after removal of the ether, was determined by the Averell and Norris method (7) (cf Part II of this review). Pfeil reported a very significant result from his toxicological investigations, that is that about one gramme of parathion was lethal to a man of approximately 70 kilogrammes weight.

(To be continued)

REFERENCES

- (31) Pfeil, E., & Goldbach, H., *Klin. Wochschr.*, 1953, 31 (41-42), 1011.
- (32) Gruch, W., *Naturwissenschaften*, 1954, 41 (2), 39-40.
- (33) Cook, J. W., *J. Ass. Off. Agric. Chem.*, 1954, 37 (4), 984.
- (34) *Idem*, *ibid.*, 1954, 37 (4), 987.
- (35) *Idem*, *ibid.*, 1954, 37 (4), 989-996.
- (36) March, R. B., Metcalf, R. L., & Fukuto, T. R., *J. Agric. Food Chem.*, 1954, 2 (14), 732.
- (37) Pfeil, E., *Deut. Z. ges. gerichtl. Med.*, 1953, 42, 449.

Bessemer Centenary

IN co-operation with the Science Museum, South Kensington, the British Iron & Steel Federation is to create a new ferrous metallurgical display in the museum to commemorate Sir Henry Bessemer. For this purpose the sum of £50,000 has been allocated. It is hoped the gallery will be completed within three years. Preliminary plans for this exposition are being prepared in consultation with the museum authorities.

The Minister of Education has expressed his gratitude to the industry for showing their interest in the museum in so practical a way.

Institution of Metallurgists

Important Work Discussed at AGM

THE annual luncheon of the Institution of Metallurgists took place on Tuesday, 15 May, 1956, at the Park Lane Hotel, Piccadilly, London W1, with the president, Professor F. C. Thompson, in the chair.

The principal speaker, the Rt. Hon. Sir David Eccles, K.C.V.O., Minister of Education, made reference to the part played by the Institution in the furtherance of technological education, and to the progress made by the Institution in a comparatively short time.

The luncheon was followed by the annual general meeting, at which Mr. G. L. Bailey, C.B.E., director of the British Non-Ferrous Metals Research Association, was elected president, and Mr. J. Mitchell, C.B.E. (a director of Stewarts & Lloyds Ltd., Corby), senior vice-president. Mr. W. E. Ballard

(director of Metallisation Ltd., Dudley), and Mr. A. J. Murphy (formerly Professor of Industrial Metallurgy at Birmingham, now Principal of the College of Aeronautics) were elected vice-presidents. Dr. E. C. West became honorary treasurer for a further year.

The newly elected members of the council are Mr. W. E. Bardgett (United Steel Co. Ltd., Sheffield), Mr. E. J. Bradbury (The Mond Nickel Co. Ltd., Birmingham), Dr. N. P. Inglis (ICI Ltd., Metals Division, Birmingham), and Mr. F. H. Keating (ICI Ltd., Billingham Division, Co. Durham).

The new president, in his presidential address, discussed the important work of the Institution in promoting the interests of metallurgists, and for the Institution, of which the total membership is now 3,331. He felt that metallurgy offered a most attractive and exciting opportunity for new development and expansion, in spite of some competition from other materials. He went on to consider the Institution's qualifications, and the type of training which a metallurgist required, particularly in emphasizing the need of broad training in the humanities and basic science, as a preliminary to specialist instruction in metallurgy.

Hungarian Chemical Output

HUNGARIAN chemical industry output is to be doubled under a five-year £150,000,000 development plan, now being discussed before going to Parliament in a few weeks time.

Sulphuric acid production is to be raised from 124,000 tons in 1955 to 200,000 tons by 1960. Caustic soda output (11,400 tons last year) is to be increased to 40,500 tons in five years. Fertilizer production as a whole will be more than trebled to 150,000 tons a year by 1960. The 1955 output of nitrogenous fertilizers is to be increased seven times by 1960 and phosphorus fertilizer production doubled.

The plastics raw materials target for 1960 is 11,600 tons. Much of this will come from the Tiszapalkonya Chemical Combine, to be completed before the plan ends, which will process methane gas piped from Rumania.

Mechanization of the chemical industry is to be stepped up. Two and a half times more machinery, one and a half times more transporting machines, and nearly twice as many pipes and compressors as last year are to be produced by 1960.

Monsanto's Progress Last Year

Increased Turnover But Profit Slightly Lower

PROFIT of Monsanto Chemicals Ltd. for the year ended 31 December 1955, was £998,150 after providing for taxation, depreciation, directors' remuneration and audit fee. After adding provision for taxation in prior years no longer required, decrease in reserve for inter-company profit in inventory valuation of subsidiary company and the carry-forward from the previous year, and subtracting a further amount set aside as provision against grant to associated company, together with dividends paid, a balance of £2,686,040 was left to be carried forward to next year.

The board paid a second interim dividend on 4 April 1956. No further distribution is recommended in respect of 1955.

Sales Record

In his statement to the company the chairman said: 'I am pleased to report that in 1955 the company's business continued to grow both in volume and turnover. Sales established a new record at £13,499,986, an increase of seven per cent over 1954. Tonnage of goods dispatched reached 87,800, 13.3 per cent over the previous year. Direct exports increased to £5,056,533, five per cent over 1954, and represented 37 per cent of all sales.

'Despite this increase in turnover, the profit for the year before taxation, at £1,789,573, was slightly below that of 1954. This was due to increased competition in many directions, coupled with rising cost factors. Demand both at home and abroad continued good.'

Later in his statement the chairman went on to discuss expansions carried out in 1955. The construction programme both at Ruabon and Newport was largely concentrated on new manufacturing plants, with ancillary additions to services and power installations.

Production of phthalic anhydride is being considerably expanded and the first stage of this work has been completed at Ruabon. Design work for a major new plant at Newport is well advanced. An expansion of the maleic anhydride plant at Ruabon has been completed, while a larger plant for its manufacture from benzene is being constructed at Newport. Both of these products

are basic chemicals used in the production of alkyd and polyester resins.

Additional plants for chemicals used in the manufacture of rubber products were started up at Ruabon during the year, and cyclohexylamine, an important raw material for the rubber chemicals group, is to be produced at Newport.

Monsanto's interest in polystyrene was increased when a substantial plant for the manufacture of high impact polystyrene came into production at Newport at the end of 1955. This material, Lustrex Toughened-11, is claimed to be a 'super-tough' product.

A full scale plant is now being constructed at Newport for the manufacture of styrene-butadiene copolymers (synthetic rubbers), while at Ruabon the first stage in a large addition to the synthetic phenol plant came into operation during last year.

Additional laboratories for general research, with particular emphasis on polymers, were completed at Newport. These laboratories include a special radiation laboratory which will permit an extension of Monsanto's researches into the possibility of using radiation and fission products in the manufacturing and processing of chemicals.

Subsidiaries' Progress

Progress is also reported from Monsanto's subsidiary companies. Monsanto Chemicals (Australia) Ltd. showed an increase in net turnover of 30 per cent over 1954. Net profit for the year ended 30 June 1955 was £A145,188.

A development company, Pacmodhal Pty. Ltd., was formed to study potentialities in the petrochemicals field in association with Petroleum and Chemical Corporation (Australia) Ltd. and Drug Houses of Australia Ltd.

Negotiations were continued in 1955 with the Indian Government regarding an investment by Monsanto Chemicals of India Private Ltd. in a manufacturing plant in India.

The 22nd annual general meeting of the company will be held at Winchester House, Old Broad Street, London EC2, on 19 June.

Fire Research in 1955

Valuable Work For Industry by JFRO

INDUSTRIAL fires and explosions are being studied by a special committee set up by the Fire Research Board. The chairman is Professor A. R. J. P. Ubbelohde. This is announced in the report of the Board and the report of the Director of Fire Research (Mr. S. H. Clarke, M.Sc.) for 1955, which has been published by HMSO for DSIR at 4s net. The committee is advising on a research programme to provide information that will enable industry and other bodies to avoid or reduce the effect of hazards arising from the flammability of certain dusts, vapours and gases.

In connection with explosions in industry, tests have been developed for explosimeters. The report states that there are no existing standards of performance and only scanty information about the relative behaviour of different vapours or gases with these instruments.

Outbreaks of Fire

Dealing with outbreaks of fire, the report explains that an examination of the incidence of electrical fires in Great Britain has revealed that the fires of electrical origin increase uniformly with the consumption of electricity. It seems likely that if the present trends are maintained the rate of electrical fires will be trebled in the next 20 years. In road goods vehicles the 'fire frequency' is 2.0 per 1,000 licences per year and if fire extinguishers were more widely carried on all types of road vehicles, the number of fires extinguished without the necessity of fire brigade assistance could be greatly increased. About 6,000 fires involving road vehicles were attended by fire brigades in 1952.

Combustion of dusts is another subject dealt with in the report. In connection with the prevention of smouldering in fibre insulating board, it is stated that the efficiency of a borax-boric acid treatment was approximately the same as that of an ammonium dihydrogen phosphate treatment, but the amount to be added to prevent sustained smouldering in an air draught was sufficiently large to make application difficult, and also to alter the physical properties of the boards.

Suppression of fire is considered at length under the headings of water sprays, foam, vaporizing liquid agents, dry powder agents and wetting agents. The effect of fire on properties of materials is also considered in the report, while special fire hazards (flammability of fabrics, burning of skin by heat, static electricity in clothing materials, woodworm preparations) are considered in detail. Of static tests the report has this to say: 'Six materials have been tested: cotton, acetate rayon, wool, Terylene, nylon and polyvinyl chloride sheets. Pairs of the last four materials gave a high charge density and the static energies associated with these amounted to about 10,000 times that of cotton rubbed with cotton.'

An investigation has been started to assess the fire hazard for a number of typical solvents and insecticides used in woodworm preparations and, where the hazard exists, to determine the time after treatment for which precautions against accidental ignition of the wood will be necessary.

As a result of the recent interest in fire detectors of different kinds, the JFRO has been asked by the BS Code of Practice Committee on Fire Alarms to review the requirements for heat-sensitive fire detectors, and to propose revised performance tests where necessary. The organization has developed a detector for locating fire in rooms filled with smoke.

Fire Detection in Smoke

Briefly, the apparatus consists of a parabolic mirror which receives infra-red radiation from the fire and focuses it on a photoconductive cell which is capable of detecting radiation from flames or surfaces at a temperature in excess of 150°C. The resistance of the cell changes when radiation falls on it and this controls the frequency of a neon tube oscillator. The output of the oscillator is fed into a pair of earphones so that the frequency of the audible tone rises when the detector is pointed at a flame.

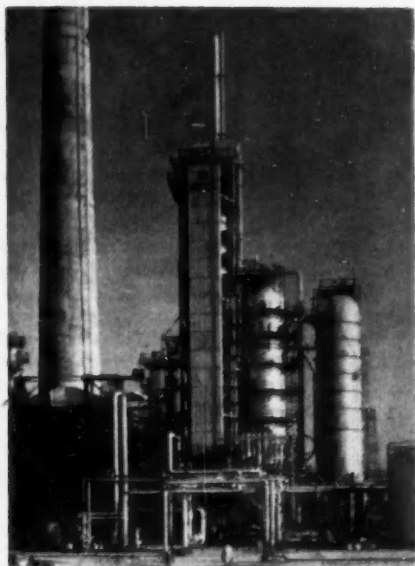
The existing research station at Elstree is to be expanded to include a building in which fires in large-scale models will be studied under controlled conditions. Staff will go up to over 100.

First UK Hydroformer

THE first hydroformer to be built at a British refinery is now in operation at the Esso refinery at Fawley near Southampton. Cost of the new hydroformer is said to be £4 million.

Up till now the main source of high quality petrol has been the fluid catalytic cracking unit (the cat cracker) which processes heavy gas oil. The new unit will produce a higher quality petrol by processing the raw petrol obtained in the primary distillation of crude oil. The feed rate will be 350,000 to 525,000 gallons a day.

Construction of the hydroformer, which has an overall height of 218 feet, began in March 1955 and was completed in March of this year.



A view of the fluid catalytic hydroformer showing the catalyst storage hopper (ribbed tower on right), the reactor, the regenerator (behind liftshaft), the scrubber tower, one of the furnaces and the furnace stack, and on the extreme left, the stabilizer

Construction Begun

Construction has begun on Mobil Oil Company's new central laboratories building which is due for completion in the spring of 1957. It is being built next to the company's Coryton refinery.

Chemisorption Symposium

A SYMPOSIUM on 'Chemisorption' will be held by the Chemical Society at the University College of North Staffordshire, Keele, Staffs, from 16 to 19 July. Subjects to be covered are the theory of chemisorption, chemisorption on insulators, chemisorption on metals, chemisorption on carbon, and chemisorption on semiconductors.

Visits have been arranged to ICI Alkali Division and to several pottery manufacturers.

The papers presented at the symposium will later be published, with a full report of the discussion, in book form. The closing date for registration is 1 July. Forms are obtainable from the general secretary of the Chemical Society, Burlington House, London W1.

Complexones Developments

A LECTURE on 'Complexones: Some Recent Developments' was given by R. E. Stuckey, B.Sc., Ph.D., F.P.S., F.R.I.C., of British Drug Houses Ltd. at a meeting of the Scottish Section of the Society for Analytical Chemistry in Edinburgh on 11 May.

Following the introduction into analysis of a number of complexing agents by Schwarzenbach, ethylenediaminetetra-acetic acid (EDTA) in particular has become increasingly used. Some of the methods available for the determination of metal cations using EDTA were discussed and the methods of end-point determination were reviewed.

The use of a new complexing agent, 1:2-diaminocyclohexane tetra-acetic acid, which forms more stable chelates than EDTA has further extended the analytical applications of complexones, and new indicators such as pyrocatechol violet and metalphthalein have been introduced.

End-point determination in EDTA titrations often presents some difficulty and the application of high frequency titration methods is of great value. The principles of high frequency methods were briefly described and simple types of apparatus were shown. Conditions necessary for EDTA titrations were described and results obtained by different methods discussed.

New Address

Societe Auxiliare Thermochemique, formerly of 91 Boulevard Malesherbes, Paris 8*, has transferred its offices to 9 rue Boissy d'Anglas, Paris 8*.

New Fertilizer Works

SAI Project at Leith

A LARGE fertilizer works is being built by Scottish Agricultural Industries Ltd. on land reclaimed by Leith Dock Commission. So far 12 acres have been reclaimed, but tipping is still in progress and the ultimate aim under the present scheme is 19 acres. The site has a deep water berth and a railway marshalling yard.

The new factory will produce granular concentrated compound fertilizers on a large scale. The whole project, including reconstruction work at the existing fertilizer works of SAI at nearby Salamander Street, Leith, is expected to cost over £3,000,000. Raw materials—phosphate rock, sulphur and potash etc.—arriving by ship will be unloaded at the rate of 350 tons per hour by three new dock-side grabbing cranes being installed by the Leith Dock Commission. Thereafter the material will travel by conveyor, housed in an overhead gantry, to the main storage building.

Storage Capacity

This store is one of the main features of the site, being 907 ft. long by 100 ft. wide with a double deck overhead conveyor gantry running the whole length. Here different types of raw materials amounting to 56,000 tons will be stored near where they will subsequently be processed.

The first process plant—expected to go into production this August—is a Simon-Carves/Monsanto sulphur burning contact sulphuric acid plant with a rated capacity of 175 tons of acid per day. Waste heat from the combustion of sulphur will be used to produce 17,000 lb./hr. of high pressure steam. The second main process plant will manufacture phosphoric acid from phosphate rock and sulphuric acid by the Prayon reaction process, followed by the tray filter in which waste gypsum is extracted from phosphoric acid magma by vacuum filtration. The finished fertilizers will be produced in the third process building, to which will be delivered the phosphoric acid and various other raw materials required for the manufacture of concentrated fertilizers incorporating ammonium phosphate. The compounding and granulation plant has been designed by Dorr-Oliver Inc., Stamford, US, and is being constructed by Simon-Carves Ltd.

Fertilizers from the new factory will be sent to various SAI centres in Scotland. The main distribution for the Leith area will take place from the existing SAI works in Salamander Street. Old plants and buildings at these works have been demolished to make way for a new compounds store of 40,000 tons capacity and high speed bagging plant.

Price Changes

CONTINUED rise in cost of freight, raw materials and power has made it necessary for Albright & Wilson Ltd. to increase prices of certain of their products. The new prices are as follows:—

	£	s.	d.
Ammonium phosphate, mono-, ton lots, d/d.	106	0	0 per ton
Ammonium phosphate, di-, ton lots, d/d.	*97	10	0 "
Phosphoric acid, Tech. (S.G. 1.700), ton lots, carriage paid	100	0	0 "
Phosphoric acid, B.P. (S.G. 1.750), ton lots, carriage paid	*1	4	per lb.
Sodium metaphosphate (Calgon), flaked, loose in metal drums	143	0	0 per ton
Disodium phosphate, cryst., ton lots, carriage paid	40	10	0 "
Disodium phosphate, anhyd., ton lots, carriage paid	88	0	0 "
Trisodium phosphate, cryst., ton lots, carriage paid	*39	0	0 "
Trisodium phosphate, anhyd., ton lots, carriage paid	86	0	0 "
Carbon tetrachloride, ton lots, carriage paid	*79	10	0 "

* Price unaltered.

Monsanto House Move

THREE departments of the London headquarters of Monsanto Chemicals Ltd. moved into the company's new office building, Monsanto House, 10-18 Victoria Street, London SW1, on 26 May. They are the advertising department, the department of industrial & public relations, and the office management department. The telephone number is ABBey 5678 (Telegrams: Monsanto London Telex; Cables: Monsanto London).

On 4 June, the sales division, Monsanto Plastics Ltd., Monsanto (Soil Conditioners) Ltd., and the credit & collections department move into the new building. The accounting department, insurance department, and purchasing department move in on 11 June, the engineering department moves in on 18 June, and the directors, the legal & secretarial department, and the development department move in on 25 June.

There is no 'official' opening arranged for the new building.

N-M-R Spectroscopy

Value in Structure Determination

A NEW kind of spectroscopy was demonstrated at the Second International Instrument Show, held at Denison House, London SW1, from 7 to 18 May, and organized by B. & K. Laboratories Ltd. Known as n-m-r (nuclear magnetic resonance) high resolution spectroscopy, this form of spectroscopy is based on the fact that the various isotopes of the elements can be separately identified according to their different nuclear gyro-magnetic constants. The equipment has been developed by Dr. Russell Varian, inventor of the klystron valve, and is manufactured by Varian Associates of 611 Hansen Way, Palo Alto, California.

Commercially Available

The Model V-4300 high resolution n-m-r spectrometer, now commercially available, has been designed for the study of narrow lines, chemical shifts and fine splittings. The active sample volume required for maximum sensitivity is only 0.01 ml. and the minimum number of protons or fluorine nuclei, for example, required for useful observation of high resolution signals is 10^{18} .

This apparatus is claimed to be of great value in structure determination and identification of components in mixtures. Studies at different temperatures of equilibrium mixtures containing molecular species reversibly convertible from one to the other can lead to the acquisition of information concerning equilibrium constants, energy separations of the reacting species, rates of reaction and potential barrier heights.



Super-high-resolution NMR spectroscope

Semet-Solvay Plant

Town Gas As By-Product from Heavy Oil

A N extract from the *National Gas Bulletin* of Australia describing the first Semet-Solvay plant which produces 12,500,000 cu. ft. per day of 1,000 BThU town gas from heavy oil as a by-product of its operations at Silverwater, New South Wales, has been published.

The plant, which began operations at the end of last year, was constructed by Power-Gas Corp. (Australasia) Pty. Ltd.

Starting from residual oil, the plant produces benzol, toluene and xylene and light and heavy tar. The oil cracking plant produces a gas of high calorific value with a high percentage of ethylene and propylene.

From Silverwater, the gas by-product is fed through a main to the Mortlake plant of the Australian Gas Light Co. A feature of the installation is the inclusion of the first Didier-Kogag final tar dehydration unit outside of Europe. This unit has a capacity of 100 tons of tar per day.

Two-Stage Removal

In this dehydration process H_2S removal is accomplished in two stages: a vacuum carbonate plant bringing down the content from approximately 500 grains to 50 grains H_2S per 100 cu. ft., from which point the gas passes to tower purifiers which form a striking departure from conventional practice in Australia. Operating at 50 psig, the purifiers bring H_2S content down from 50 grains to the legal standard required for town gas.

• HOME •

Gas Coke Price Increases

Consequent upon the eight per cent increase in the price of coal, which will increase the gas industry's coal bill by about £8½ million, it will be necessary to increase gas coke prices throughout the country by 9s per ton, except in the area of the West Midlands Gas Board where the increase will be 8s 4d per ton, from Friday 1 June 1956. The necessary amendments to maximum retail prices under the Retail Coal Prices Order 1941 will be made from that date.

Water Pollution Index

The index to 'Water Pollution Abstracts', Vol. 28, 1955, has been published by the Department of Scientific & Industrial Research and is available from HM Stationery Office, price 3s 6d. The abstracts are published monthly, and wherever possible the original literature is consulted and a fair summary made. When it is not possible to consult the original literature the abstract is prepared from a published summary or abstract.

Standard Railway Charges

A revised scale of standard railway charges, covering the 5 per cent and 7½ per cent increases of railway charges which came into force on 23 April last, has been published by the Railway Shipping & Publishing Co. Ltd. The rates shown cover all classes of goods in classes one to 20, and in addition to the station-to-station rates, the collected and/or delivered rates are also shown for classes 11 to 20.

SCI Pesticides Group

At the completion of its first full year, the Pesticides Group of the Society of Chemical Industry can claim to be firmly established as an active participant in the affairs of the society, states the hon. secretary's report for the year ended 31 December, 1955. Membership of the group on 31 December was 274, an increase over the year of 22.

Developments at Grangemouth

Plans for new buildings costing an estimated £460,000 for the development of Grangemouth petroleum chemical industry were approved at Grangemouth Dean of Guild Court recently. Twenty different structures at the premises of British Hydrocarbon Chemicals Ltd., at Bo'ness Road are

involved. The company have also been granted permission to build an 84 ft. long steel tunnel in Bo'ness Road to take service facilities from the present works across to Grangemouth air field which is being industrially developed.

Power From Fusion

The United Kingdom Atomic Energy Authority is holding on 4 June 1956, a one-day symposium on controlled thermonuclear energy. It will take place at Harwell and will be on a classified basis. Invitations have been sent to representatives of industrial research laboratories in addition to Government research establishments and British universities. About 50 people have been invited in addition to the Authority's own staff.

PVC Cards for Looms

Cards for Jacquard looms as used in the textile industry are now being made of 'Darvic' pvc foil. Corrections can be made to the cards by cementing a piece of foil over the area. Conventional punching and lacing machines may be used. The development follows experiments carried out by ICI Plastics Division in co-operation with weaving firms.

Visit to SAI Works

During his tour of Leith Docks on the afternoon of Tuesday, 29 May, Mr. Walter Elliot, M.P., visited the new fertilizer works being built by Scottish Agricultural Industries Ltd. on land reclaimed by the Leith Dock Commission from the Firth of Forth. Mr. Elliot was received by SAI's chairman, Sir William Gavin accompanied by the managing director, Mr. H. U. Cunningham; Mr. E. P. Hudson assistant managing director of SAI and a member of Leith Dock Commission; and Mr. J. P. A. Macdonald a director and chief engineer of SAI.

Paint Remover

The introduction of Epistrip, a chemical stripper specially designed to strip cold-cure and low temperature stoved types of epoxy-based paints, e.g. Epikote, Araldite, Epok etc. has been announced by Corrosion Ltd., 16 Gloucester Place, London W1. It is claimed that the use of this material makes possible the stripping by chemical means of paints which have hitherto proved unstripable.

OVERSEAS

Canadian Uranium Find

A find of uranium at Higgins Lake, 140 miles east of Uranium City, Northern Saskatchewan, has been reported by Anglo-Barrington Mines, the Canadian subsidiary of Western Selection & Development Co. of London. According to the company's geologist, shallow drilling revealed over 200,000 tons grading better than two pounds of uranium oxide.

Berne Union Conference Ends

The 13th annual conference of the Berne Union, the international union of export credit insurers, ended on 22 May in Cannes. Present as observers were Mr. Hawthorne Arey, director, and Mr. Raymond Jones, chief loan officer, of the Export-Import Bank of Washington, and Mr. T. C. Kapur, chairman of the export credit guarantee committee of the Government of India.

To Spend \$150 Million

According to Mr. G. L. MacPherson, director of Imperial Oil, the Canadian oil industry will spend more than \$150 million in the next five years to expand refining capacity. He predicted that refinery capacity would have to be increased by 30 per cent, handling another 200,000 barrels of crude oil a day, to meet the rising demand for petroleum products.

US Safety Record

A new safety record was established by the US chemical industry in 1955. Lost-time accidents amounted to 3.25 per million man-hours worked, compared with 3.27 in 1954.

IULCS Conference

The 1957 Conference of the International Union of Leather Chemists' Societies will be held in Rome from Sunday, 15 September to Thursday, 19 September with a possible extension to Friday, 20 September, if this is found necessary when the programme is nearer completion. Further announcements will be made at a later date.

World Metallurgical Congress

It is announced by the American Society of Metals that the second world Metallurgical Congress will be held in Chicago, Illinois, from 2 to 8 November. The Congress will be held simultaneously and in conjunction with the 39th national Metal Congress and Exhibition. Dr. Zay Jeffries, a former vice-

president of the General Electric Company, is again director general of the congress. Full particulars will be supplied by the Secretary, American Society for Metals, 7301 Euclid Avenue, Cleveland 3, Ohio, US.

Alox Corporation

Montgary Explorations Ltd, has acquired 58 per cent of the outstanding stock of Alox Corp. of Niagara Falls, G. A. McCartney, president, reports. Surpass Petrochemicals, of which Montgary has working control, has a 41 per cent interest in Alox. An expansion programme to cost \$1 million is to begin immediately at the Alox plant. New equipment is to be installed for the production of oxygenated hydrocarbons on a continuous basis instead of by the batch.

New Subsidiary Company

Evans Medical Supplies Ltd., announces the formation of a new subsidiary company—Evans Medical (Nigeria) Ltd. with offices in Lagos. The managing director is Mr. F. J. Warner.

Uranium Negotiations

The United Kingdom Atomic Energy Authority has entered into negotiations with Eldorado Mining and Refining Ltd. for the delivery of a substantial quantity of uranium before 31 March 1962. This will represent a major contribution to the supplies of uranium required to meet programmes for which the Authority is responsible.

Atomic Research Station

Work will begin this month on West Germany's Government sponsored atomic research station at Karlsruhe it was announced on 27 May by Dr. Franz Gurku, the city's director of economic affairs. It has not yet been decided where the reactor will be bought.

Chemical Industries Scholarship

A five-year scholarship in chemical engineering has been established at Cornell University by the American Exposition. This is in line with a long-established policy which emphasizes the importance of the educational values of the exposition. It is announced that the 26th Exposition of Chemical Industries will be held at the new Coliseum in New York, from 2 to 6 December 1957. Permanent headquarters of the exposition are at 480 Lexington Avenue, New York 17, NY.

• PERSONAL •

At the annual general meeting of the Association of Public Analysts in London on 3 May, the following were elected to office for the forthcoming year:— *president*, MR. ERIC VOELCKER; *vice-president*, MR. F. C. BULLOCK; *past-presidents*, MESSRS. G. TAYLOR, T. McLACHLAN; *honorary treasurer*, MR. H. E. MONK; *honorary secretary*, MR. D. D. MOIR; *assistant honorary secretary*, MR. F. A. LYNE; *honorary editor*, DR. E. C. WOODS.

MR. T. D. WHITTET, chief pharmacist at University College Hospital, has been elected a foreign member of the Royal Spanish Academy of Pharmacy, founded in 1589 as the Brotherhood of the Apothecaries of Madrid and one of the oldest pharmaceutical organizations in Europe. Mr. Whittet is the Academy's first British member.

MR. W. H. WHEELER, president of Airkem Inc., of New York, announces the appointment of MR. HARRY P. WARD, of Montreal, to the newly-created position of assistant vice-president and director of foreign sales. Mr. Ward, for the time being, will be located in the offices of the London, England, subsidiary, Airkem Ltd. Airkem makes products for the control and counteraction of home and industrial odours.

At the ninth annual general meeting of the Fertiliser Society, held at Fernhurst, near Haslemere, Surrey, on Thursday, 24 May, DR. JOHN MANNING was elected president and DR. B. RAISTRICK vice-president. MR. A. T. BROOK, MR. A. I. COLEMAN and MR. R. P. ROSS were elected to fill vacancies on the Council.

A Tees-side employee of ICI Ltd., ALDERMAN FRED MANTON, has been elected Mayor of Middlesbrough. He is the first employee of the firm to be so honoured.

MR. WILLIAM D. MORRISON has been appointed to the new post of manager, foreign chemical development, of Food Machinery & Chemical Corporation. Mr. Morrison will be responsible for new commercial opportunities abroad, based on FMC's

know-how and patents in the chemical field, and will be located at the FMC Chemical Division's administrative offices in New York.

MR. RAYMOND J. BOWN has been appointed export sales director of the Nobel Division of ICI in succession to MR. J. W. DONALDSON. He joined the Nobel Division in 1935. He was made manager of export sales department in 1952, and in January of this year became a member of the board of ICI (Export) Ltd.

MR. ARTHUR S. WEYGANDT has been appointed manager of Food Machinery & Chemical Corporation's chemicals central development department, with headquarters in New York.

MR. MAXSON A. EDDY has been appointed director of packaging of Squibb, a division of Olin Mathieson Chemical Corporation. Mr. Eddy will co-ordinate the activities of the Squibb packaging department with other departments of the division. In addition to his new responsibilities, Mr. Eddy will continue as general manager of Globe Collapsible Tube Corporation, another division of Olin Mathieson.

DR. F. H. BANFIELD, Director of Research, British Food Manufacturing Industries Research Association, will read a paper on 'The British Approach to Food Legislation' at the second international symposium on foreign chemicals in food to be held in Amsterdam from 9 to 11 July.

Scientist and chief chemist of the Bank of England, DR. A. C. HEALEY, has been elected Mayor of Surbiton, Surrey.

Oxford University is to confer the honorary degree of Doctor of Science on SIR ALEXANDER FLECK, chairman of Imperial Chemical Industries Ltd.

SIR HAROLD SMITH, K.B.E., chairman of the Gas Council, is to receive the Birmingham Medal—the highest award of the Institution of Gas Engineers.

Benzole Plant Fire

EARLY on 26 May, 120 firemen fought a blaze which threatened to engulf the Lancashire Tar Distillers' plant in Liverpool Road, Cadishead, midway between Warrington and Manchester. They saved more than a million and a half gallons of inflammable benzole, but five firemen were taken to hospital with burns and one was detained.

The blaze began in a corrugated-roof shed where 1,500 boxes of highly inflammable processed naphthalene salts were stored. It spread to three adjoining large tanks of crude benzole, each containing 6,000 gallons, and to the pyridine plant containing benzole by-products used for making drugs. The heat caused a number of explosions when the tops of the tanks were blown off, and flames shot up more than 100 feet. An ammonia container cracked and breathing apparatus had to be used.

'The firemen's task was an exceptionally difficult and dangerous one,' an official of the firm said, 'and they did a most praiseworthy piece of work in preventing the fire, serious though it was, from spreading to other installations.' The area affected covered more than an acre but the fire was prevented from reaching other parts of the plant by the use of foam appliances.

The deputy plant manager, Mr. F. W. Harrington, said: 'The plant will be out of commission for several months. Work is going on normally in other parts of the works. Supplies of tar by-products to the chemical and paint industries will be held up.'

Competition from Mexico

FOR the first time in the history of the American sulphur industry, extending over a period of 53 years, American producers are facing major competition from Mexican Frasch sulphur producers, said Seymour Schwartz, president of S. Schwartz & Associates, New York consulting engineers, on 24 May in an address before the New York Section of the American Institute of Mining, Metallurgical, and Petroleum Engineers in the Mining Club.

Mr. Schwartz stated that the Mexican industry is pursuing an aggressive course in the competition of the two countries, with price cuts on both sides. He pointed to 'significant' imports by the United States 'for the first time in 50 years'. He emphasized that there had been a considerable drop in exports by American producers.

'At no time in the past has the American sulphur industry faced the problem of stiff competition except when it was born,' said Mr. Schwartz. 'For nowhere else in the world did the Frasch process exist except on the American Gulf coast.' This picture had changed with the advent of Frasch sulphur production in Mexico.

Plastics Conference

The programme of the conference to be held by the British Plastics Federation at the Pajace Hotel, Torquay, from 27 to 30 September has been announced. The conference is the first of its kind to be held by the Federation and all members are eligible.



Bulk delivery of pure dried vacuum salt is performed by this special vehicle introduced by ICI Salt Division. Salt is pumped by compressed air direct from the vehicle to the customer's premises

Facilities Expanded

CANADIAN Oil Companies Ltd. will expand its petrochemical manufacturing facilities with a \$3 million installation at its Sarnia refinery. Construction costs will be provided from current operations, W. Harold Rea, president, announced.

For the first three months of 1956 sales are up 15 per cent and earnings show a satisfactory increase, Mr. Rea reported.

Construction of a Udex extraction plant and a second platforming unit is to be started at Sarnia this fall. The Udex plant will have a design capacity of 3,650 barrels per day, and is the first Canadian plant for extracting chemically pure benzene, toluene and xylene from petroleum. Output of the platforming unit will be 4,400 barrels.

Production by August 1957 is anticipated and in that case, refinery profits for the last quarter of 1957 should benefit materially, Mr. Rea said.

Total benzene output has already been contracted for by neighbouring chemical plants. The other products, toluene and xylene, will be used in motor fuels, and company engineers say that, along with existing facilities, the refinery will be in a position to keep well ahead of the high octane requirements anticipated for several years.

Sales by Canadian Oil Companies of petrochemical raw materials last year totalled 20 million gallons. Mr. Rea says in his letter to shareholders that petrochemicals are becoming more and more important in refinery profits. About 25 per cent of all chemicals are now derived from oil and gas and even higher percentages are expected by some leading experts.

Wills

MR. CHARLES HERBERT BURTON, of Chickney Hall, Broxted, Dunmow, Essex, vice-chairman of Laporte Chemicals Ltd., Laporte Industries Ltd., and Laporte Titanium Pigments Ltd., who died on 28 January, left £276,193 gross, £269,974 net value. (Duty paid £148,503).

MR. WILLIAM HAROLD MANLEY, a former director of Manley & Co. (Wolverhampton), paint and varnish manufacturers, left £15,050 net (duty paid £1,149).

MR. CHARLES WATSON MOORE, former technical director of Joseph Crosfield & Sons, left £22,166 (£21,949 net).

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Publications & Announcements

THIOGLYCOLLIC acid is the subject of a booklet published by Robinson Brothers Ltd. of Ryders Green, West Bromwich. This material, also known as mercaptoacetic acid, is a clear, fairly viscous liquid, with a characteristic odour. It is miscible in all proportions with water and with most of the common organic solvents. It is, however, only partially soluble in chloroform and is insoluble in paraffin hydrocarbons. Many uses are suggested for thioglycollic acid by the makers. Emulsion polymers or copolymers of 1,3 butadiene are rendered resistant to hydrocarbon solvents by saturating double bonds of the polymer with thioglycollic acid or one of its esters. The product can still be vulcanized in substantially the same way as the original polymer. It has been found that the addition of terpene thioesters of thioglycollic acid to GR-S reduces the milling time. The quality of copper deposits from plating baths may be improved by the addition of thioglycollic acid. Various analytical uses are also suggested, i.e. in the colorimetric determination of small amounts of iron, as an inhibitor for iron in the colorimetric estimation of aluminium by Aluminon, and as an aid in the determination of nickel in the presence of iron, cobalt, copper, silver, lead, arsenic and bismuth.

* * *

A BOOKLET on 'Corrosion and Its Prevention at Bimetallic Contacts' has been published by HMSO (1s 6d) on behalf of the Corrosion & Electrodeposition Committee of the Inter-Service Metallurgical Research Council (Admiralty and Ministry of Supply). It is an attempt to provide up-to-date and reliable information on the subject, primarily for designers in government departments and government contractors although it should be of considerable interest and value to all who are, or should be, concerned with metallic corrosion. The text provides general information about the conditions in which bimetallic contacts are most likely to lead to troublesome corrosion and also about the means of mitigating such effects. This should be read in conjunction with the table which follows. By a system of symbols it indicates the relative effects on the corrosion of a range of metals when brought into mutual contact and bridged by water containing an electrolyte. The table

is arranged in two main groups of metals, the first in sequence approximately similar to the 'Schedule of Potentials' included in many documents. The second group comprises chromium, stainless steel, titanium and aluminium, which develop highly protective oxide films and behave as relatively noble metals under conditions favourable to the maintenance of such films but are, in some cases, less resistant in conditions in which breakdown of the films is possible. It is these metals in particular that cause difficulty in attempting to predict the behaviour of bimetallic contacts from a schedule of potentials.

* * *

THE fifth volume in The Natural Rubber Development Board's series of handbooks on latex under the general title of 'Natural Rubber Latex & its Applications' is now available, free of charge, from the Secretary, The Natural Rubber Development Board, Market Buildings, Mark Lane, London EC3. Entitled 'The Applications of Latex to Textile & Allied Materials' by C. M. Blow, B.Sc., Ph.D., F.R.I.C., this 135-page handbook provides the necessary background information, and the general principles involved in the application of latex to textiles, the treatment of yarns, threads and cords. Three chapters are devoted to rubber-textile composite products, latex treatment of pile fabrics, and latex bonded fibrous structures. The handbook is liberally illustrated, and 21 pages deal with abstracts of patents.

* * *

THE first of a series of brochures describing plant made by the British Ceca Co. Ltd., of London, has been published. It explains and illustrates the Hersey reverse-jet filter for continuous gas cleaning. In its simplest form a reverse-jet filter of the Hersey type consists of one or more wool felt sleeves which are surrounded by travelling slotted rings fed by air from a blower or high pressure centrifugal fan. Limitations in the operation of the Hersey filter are caused in the main by the material of which the sleeve is made. Dense wood felt, generally, has been found to be the most effective material, although its use is confined to air temperatures of 190°F to 200°F and only mild acid or alkaline conditions.

Special treatment of the felt by impregnation or coating with synthetic resins is possible to arrest corrosive action under certain conditions. The use of Terylene or other synthetic fibres as sleeves is being investigated, and the company feels that when a truly felt-like material is found that has the ability to remain porous, the use of the Hersey filter will be greatly extended. Some of the advantages claimed for the Hersey filter are that its efficiency is high, even for dust of sizes between 1 and 0.1 micron, the output of cleaned gas is constant, operation continues as the reverse jet of cleaning air is applied during the passage of the gas to be filtered, and is extremely adaptable as the intensity of the jet, its frequency, and the speed of movement of the rings, can be regulated at will. The brochure lists 13 industrial applications to which the Hersey reverse-jet filter is suited.

A BROCHURE on 'The Receipt and Storage of Products in Bulk' has been issued by Price's (Bromborough) Ltd. It sets down some of the many advantages of bulk storage, and is an attempt to cope with numerous enquiries from interested custom-

ers. Bulk delivery of Price's oleines, textile oils, fatty acids and fatty alcohols is made in stainless steel insulated road tank cars, which are cleaned and tared before filling and are weighed before despatch from the works. Products are filled at the correct temperature to ensure delivery in a fluid condition under all normal circumstances, but steam coils are fitted on the tank cars so that, in an emergency, the contents can be heated at the customer's premises. According to the booklet, the four main advantages of bulk storage are: lower price; less handling and storage space required; materials are on tap, with no risk of spillage in transfer from containers; handling, storing and returning of empty drums is eliminated.

New London Offices For Compoflex

To cope with greatly increasing business; the Southern Flexibles Centre of Compoflex Co. Ltd.—and the company's head office and sales staffs—are moving from Grosvenor Gardens to larger premises at 23-25 Northumberland Avenue, London WC2 (Tel: TRAfalgar 7800). The new address will come into effect from 2 July.

test sieve shaker

For accurate particle size analysis of materials, vibration alone or hand shaking is insufficient. Vibration alone is more inclined to aggregate the material. The INCLYNO ensures perfect segregation of particle sizes in the shortest possible time with the double movement of gyrating and jolting the test material.

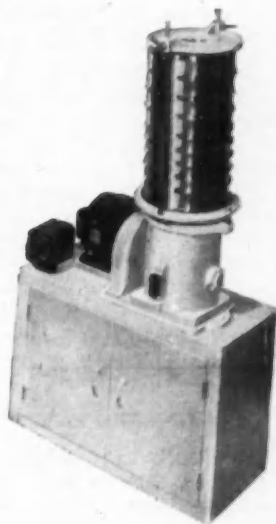
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Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

WATFORD CHEMICAL CO. LTD., London W.—30 April, £105,750 charge, to L. B. Prince, London, and another; charged on 22 to 34 (even) Copperfield Road, Mile End, London E. *Nil. 31 December 1954.

Satisfactions

BRITISH CELANESE LTD., London W.—Satisfaction 4 May, of Trust Deed and supplemental deed respectively registered 2 October 1943 and 8 November 1944, to the extent of £23,700.

HENRY HEATON & CO. LTD., Bradford, soap manufacturers etc.—Satisfaction 30 April, of charge registered 8 June 1949.

Increases of Capital

KINGSLEY & KEITH LTD., importers and distributors of colours, dyes & chemicals, Queen's House, 8 Queen Street, London, EC4, increased by £20,000 beyond the registered capital of £5,000 by the addition of 20,000 ordinary shares of £1 each to rank *pari passu* with the existing ordinary shares. Issued share capital increased to 24,000 ordinary shares of £1 each, fully paid.

SUPRA CHEMICALS & PAINTS LTD., Hainge Road, Tividale, Tipton, Staffs, increased by £30,000, in 120,000 ordinary shares of 5s each, beyond the registered capital of £20,000.

BRITISH RECOVERED RUBBER & CHEMICAL CO. LTD., 544 Ashton New Road, Clayton, Manchester, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £60,000.

DARLINGTON CHEMICALS LTD., Cockerton, Darlington, increased by £999,900 in 350,000 6 per cent cumulative redeemable

preference and 649,900 ordinary shares of £1, beyond the registered capital of £100.

L. LIGHT & CO. LTD., chemists, chemical manufacturers etc., 15 Cromwell Road, London SW7, increased by £2,000, in £1 shares, beyond the registered capital of £2,000.

L. F. LAVENDER & CO. LTD., Bells Yew Green, Tunbridge Wells, Kent, increased by £23,000, in six per cent cumulative preference shares of £1, beyond the registered capital of £2,000.

TYNE CHEMICAL CO. LTD., Pilot Street, South Shields, increased by £6,500, in £1 ordinary shares, beyond the registered capital of £6,000.

GEMEC LTD., 120 Moorgate, London EC2, increased by £1,000,000, in £1 shares, beyond the registered capital of £1,000,000.

MORITZ CHEMICAL ENGINEERING CO. LTD., 204 Earls Court Road, London SW5, increased by £3,000, in 2,250 preference shares of £1 and 7,500 ordinary shares of 2s each, beyond the registered capital of £2,000.

CROCKFORD & GEER LTD., 10 Bridge Street, Christchurch, Hants, increased by £4,900 in £1 shares, beyond the registered capital of £100.

BRITISH OXYGEN CO. LTD., Bridgewater House, Cleveland Row, London SW1, increased by £10,000,000, in £1 shares, beyond the registered capital of £15,000,000.

New Registrations

Chemicals & Produce (Dublin) Ltd.

Private company (16,091). Registered in Dublin 27 April. Capital £1,000 in £1 shares. To carry on the business of general importers and exporters of merchandise etc. Subscribers (each with one share) are: Michael Barry, 5 Auburn Avenue, Donnybrook, Dublin, and Patrick Griffin, 46 Merlyn Road, Dublin. The first directors are not named.

H. Taylor Chemicals (Industrial) Ltd.

Private company (566,374). Registered 23 May. Capital £100 in £1 shares. To carry on the business of manufacturers of and dealers in chemicals etc. Directors: Henry Sheridan-Taylor and Abram Schneider, both of 103 Wick Hall, Hove, Sussex. Secretary: A. Schneider. Reg. office: 47/8 Great Dover Street, London W1.

[continued on page 1244]

Triketo- hydrindene hydrate

(indanetrione hydrate ; ninhydrin)

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Triketo - hydrindene hydrate (ninhydrin) is a solidly established reagent of continually growing importance, particularly by reason of the increasing interest in amino acids.

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THE BRITISH DRUG HOUSES LTD.

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New Registrations

continued from page 1242

Metalcare (Plant & Products) Ltd.

Private company. (566,339). Capital £100 in £1 shares. To carry on the business of manufacturers of and dealers in chemicals and chemical products, derusters, descalers etc. Subscribers (each with one share): C. A. Prince, 10 Ashbourne Road, London W5, solicitor; Mrs. Jeanne Moody, 9 Ascot Gardens, Southall, Middlesex. First directors to be appointed by subscribers. Solicitor: C. A. Prince, 153 Uxbridge Road, London W7.

Company News

The British Drug Houses Ltd.

For the first time the consolidated sales of the company and its overseas subsidiaries reached a total in excess of £5,500,000, an increase of six per cent. This was announced in the report of the directors for the year ended 31 December 1955. The consolidated profit and loss account shows that the year's trading resulted in a consolidated profit, before charging interest, depreciation and taxation, of £749,722, compared with £702,648, in 1954. Increased depreciation charges, however, shaded down this improvement, and the consolidated profit, before taxation, totalled £522,076, compared with £485,841 last year. The directors recommend a dividend of 17½ per cent on the ordinary stock, less tax, amounting to £60,375, leaving a balance of £117,945 to be carried forward.

Hickson & Welch (Holdings) Ltd.

The directors of Hickson & Welch (Holdings) Ltd. have declared an interim dividend of 4 per cent, less income tax, at 8s 6d in the £, on the issued ordinary share capital of the company for the year ending 30 September 1956. This dividend will be payable on 5 June to shareholders on the register on 23 May 1956.

Reichhold Chemicals Ltd.

Group profit of Reichhold Chemicals Ltd. for the year ended 31 December 1955, amounted to £335,802, before taxation. Profit after taxation totalled £170,877. A final dividend of 10 per cent makes a total ordinary dividend of 17½ per cent, plus a cash bonus of five per cent. A further £100,000 has been placed to 'General Reserve'.

Market Reports

LONDON.—A little more activity has been reported during the past week and a steady demand characterizes most sections of the industrial chemicals market. The general run of the potash and soda products is moving well against contracts and a good call has been maintained for copper sulphate, hydrogen peroxide, borax and boric acid. Prices throughout the market are firm. Among the coal-tar products there has been a brisk demand for creosote oil, carbolic acid and naphthalene, with the latter product in none too plentiful supply.

MANCHESTER.—The past week has seen a satisfactory resumption of trading activity on the Manchester chemical market after the holiday break. Prices generally, with the outstanding exception of the non-ferrous metal products, are on a stable basis. The quotation for sulphate of copper has come down sharply by over £7 a ton to £100 10s, less 2 per cent, f.o.b. Liverpool. A fairly steady call for bleaching, dyeing and finishing chemicals is reported, and most other industrial consumers are taking steady deliveries under contracts. A fair number of additional home and export enquiries are in the market. With an odd exception the coal-tar products are going steadily into consumption.

GLASGOW.—The general position during the past week in the Scottish heavy chemical market was very favourable and a brisk week's trading has to be reported. This applies also to the agricultural side where continued improvement and activity was maintained. On the whole, prices have remained firm. The position in regard to export is fairly satisfactory with the usual volume of enquiries being received.

Time Not Ripe

The time is still not economically ripe for large industrial concerns to build their own atomic power stations. That is the conclusion which has been reached by ICI Ltd., according to one of its leading technical managers, Mr. L. Dobson, of the Alkali Division. 'If coal prices continue to go up, however, while the immense efforts put into atomic energy bring nuclear prices down, an atomic power station for us may well prove an attractive proposition before long,' adds Mr. Dobson.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

**WEST MIDLANDS GAS BOARD
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DIVISION****WORKS CHEMIST—WORCESTER**

CANDIDATES should hold an appropriate qualification and should preferably be capable of exercising chemical control of modern gasworks procedure.

The salary will be within Grade 7 (£670 by £20 to £750) of the National Salary Scales.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, giving details of age, qualifications and experience, should be addressed to Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Newton Road, Worcester, to reach him not later than 11 June, 1956.

J. C. INGRAM,

Secretary to the Board.

A vacancy occurs for an **INDUSTRIAL CHEMIST** on the editorial staff of a leading Chemical Journal in London. Extremely interesting work and although previous editorial experience is not necessary, ability to write lucidly is essential.

Applications, which will be treated in strictest confidence, should give full details of experience and salary required and should be addressed to **THE MANAGING DIRECTOR, BOX NO. C.A. 3470, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4**

LAPORTE CHEMICALS, LTD., have vacancies for **CHEMISTS AND ASSISTANT CHEMISTS** for analytical and process control work at their Warrington factory. The positions are permanent and progressive and a pension scheme is in operation. Write, stating age, experience and qualifications, to **GENERAL MANAGER, LAPORTE CHEMICALS, LTD., BARONET WORKS, WARRINGTON.**

BILLINGHAM**DIVISION****GRADUATE CHEMISTS**

are invited to apply for appointments in
RESEARCH, DEVELOPMENT
and
PRODUCTION

with the Billingham Division

Since its inception in the early 1920's Billingham Division has grown rapidly and today is one of the largest production units in the world. More than 60 products totalling some 2,000,000 tons are produced annually: the range includes fertilisers, industrial heavy chemicals, building materials and a wide variety of organic compounds.

A vigorous research and development group has played its part in the growth of the Division. Today, men of initiative, who are prepared to accept responsibility and who would be keen to enjoy the experience of contributing to the further expansion of this vital concern are required for work in the laboratories, in production, and in the techno-commercial field.

For these appointments, which are permanent and pensionable and which offer excellent prospects for advancement, a good honours degree is necessary.

The company operates a profit sharing scheme; it gives assistance towards house purchase and makes grants towards removal expenses for married men.

Please write giving age, details of qualifications and experience to the Staff Manager, Imperial Chemical Industries Limited, Billingham Division, Billingham, Co. Durham, quoting advertisement reference 0.6.

Situations Vacant—continued

MINISTRY OF SUPPLY: INDUSTRIAL CHEMISTS.

The Civil Service Commissioners invite applications for 25 pensionable posts.

Age at least 23 and under 35 on 1 January, 1956, with extension for regular Forces service, established civil service, and temporary service as Industrial Chemist.

Candidates must have: (a) University honours degree in Metallurgy, Engineering, Chemistry, Physics, or Chemical Engineering; or (b) be Associate Members of the Royal Institute of Chemistry, the Institution of Metallurgists or the Institution of Physics; or (c) Corporate Members of the Institution of Chemical Engineers. A candidate appointed under (a) or (b) must have, or acquire, at least three years' approved experience before appointment is confirmed. Exceptionally, a candidate otherwise qualified by very high professional attainments may be admitted.

Starting pay for 45½-hour week in London according to age from £659 (age 23) to £1,099 (women £1,072) at 34 or over. Maximum £1,252 (women £1,171). Women's pay being improved under equal pay scheme. Promotion prospects. Pay and conditions of service are under review.

Further particulars and application form from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1, quoting 8/4593/56/8. Completed applications should be returned by 23 June, 1956. 10805/120/5/56/TG.

CHEMISTS

required by

THE ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, BERKSHIRE.

in the following Grades:—

CHEMISTS Basic Grade (Ref. 1159/38) to control the chemical process and gas purification production plants in the Chemical Engineering Branch working on a shift basis. Candidates should hold A.M.I.Chem.E. or A.R.I.C. or have exempting qualifications; alternatively they should have an Honours degree in Chemistry or Chemical Engineering. Some previous experience of plant control work is desirable but not essential. Salary £766 (at age 25)—£1,050 (at age 34 or over)—£1,199 p.a.

EXPERIMENTAL OFFICERS/ASSISTANT EXPERIMENTAL OFFICERS (REF. 1160/38) to join a Research and Development team engaged on a new field of applied chemical research and technology. The minimum qualification is H.N.C. Chemistry or equivalent; applicants for the Experimental Officer grade should be at least 26 years of age. Candidates should have had good experimental experience in the inorganic field and preferably also on pilot plant scale operation.

SALARY. Experimental Officer £846—£1,040 p.a. Assistant Experimental Officer £353 (at age 18)—£460 (at age 21)—£756 p.a. At present the rates for women are slightly lower. Contribution Superannuation Scheme. Married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates; alternatively assistance towards legal expenses incurred in house purchase may be available. Until housed a lodging allowance may be payable. Requests for application forms by **POSTCARD** to Senior Recruitment Officer at the above address not later than 11th June, 1956, quoting the appropriate reference number.

WILTON



WORKS

Applications are invited from

GRADUATE CHEMISTS

or

CHEMICAL ENGINEERS

with a good Honours Degree, for employment in the planning and operation of the services and facilities required by a large integrated chemical factory.

Wilton Works is expanding fast, and new plants are being designed, constructed and brought into operation each year. It is situated at the foot of the Cleveland Hills and close to the North Yorkshire coast. There is a wide range of recreational facilities in the district, and among the many provided by the Company are golf, tennis and squash racquets.

The appointments are permanent and carry an attractive salary. There are contributory pension and profit-sharing schemes. Assistance can be given towards purchasing a house, and a contribution is made to the removal expenses of married men.

Applicants without industrial experience will receive consideration, as training facilities exist.

Apply for an application form to the Staff Manager, Imperial Chemical Industries Limited, Wilton Works, Middlesbrough, Yorkshire, quoting advertisement reference ICI/X/304/c

THE ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, BERKSHIRE

requires
PRINCIPAL OR SENIOR SCIENTIFIC OFFICER AND SCIENTIFIC OFFICER

for the following posts:—

PRINCIPAL OR SENIOR SCIENTIFIC OFFICER. REF. 1169/38. To lead a team concerned with chemical process development and plant design studies. This post offers experience of novel problems in the atomic energy field. Applicants should hold a first or second class honours degree in Chemical Engineering or Chemistry and/or A.M.I. Chem. E. They should be well qualified Chemical Engineers with some research and development experience, or, alternatively, qualified Chemists with experience in Chemical Engineering.

SCIENTIFIC OFFICER. REF. 1169/38. To investigate compatibility problems with special reactive inorganic chemicals and the development of bonding and scaling preparations for special applications. Applicants should hold a first or second class honours degree in chemistry and have experience in the fields of corrosion and/or surface coatings.

SALARIES will be assessed according to age, qualifications and experience within the following scales:—

Principal Scientific Officer £1,339—£1,771 p.a.

Senior Scientific Officer £1,174—£1,339 p.a.

Scientific Officer £555—£1,000 p.a.

At present the rates for women are slightly lower.

CONTRIBUTORY SUPERANNUATION SCHEME.

Married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates; alternatively assistance towards legal expenses incurred in house purchase may be available, until housed a lodging allowance may be payable. Requests for application forms by **POSTCARD** to Senior Recruitment Officer at the above address not later than 6th June, 1956, quoting the appropriate reference number.

FOR SALE

BAKER-PERKINS STAINLESS STEEL Sigma 'Z' Jacketed Mixer, 29" x 27" x 22" with bottom outlet to each trough.

WERNER 'Z' MIXER, 21" x 20" x 19", with 5 h.p. A.C. Motor Drive.

25 GALLON Jacketed Enclosed M/S Vertical Cylindrical Mixer.

20 GALLON 4-speed Detachable Bowl, 3 h.p. Electric Mixer.

COPPER COATING PAN, 22" x 16".

GRINDING MILL, Stainless Steel, 8".

High Speed Vertical Plate Type.

WINKWORTH MACHINERY LTD., 65 High Street, Staines. Tel.: 1010.

Approx. 10 tons—

10 ft. by 4 ft. by 12 gauge

EW3 Acid Resisting Steel in fully softened and descaled condition. EN 58 J—Price £475 per ton as and where lying. **BOX NO. C.A. 3475, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

FOR SALE—1,500 tons Crude Hot-pressed Naphthalene, 78/78.9° C. Low price. **BOX NO. C.A. 3473, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

PUMPS for sale—two, size 1A Universal Rotary Displacement, unused. Coupled in tandem, flameproof motor, 440 volt, 3-phase, 0-300 g.p.h., 30 ft. maximum head. Independent control. Apply to **THE BUYER, THE BRITISH OXYGEN CO., LTD., DEER PARK ROAD, LONDON, S.W.10.**

CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" WORKS, BOW, COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES BOCHURCH LONDON." TELEPHONE: 3285 EAST.**

FOR SALE—60 tons Wool Wax. Low price accepted. Can be inspected. Sample free. **H. M. KERSHAW, OXENHOPE, KEIGHLEY.**

400 lb. Powder Mixer for sale. Discharge 6 in. by 6 in. Motor driven. Photo. **F. J. EDWARDS LTD., 359, Euston Road, London, N.W.1.**

MIXERS—1 Baker Hand-tilted Trough, 16 in. by 24 in. by 20 in. Fast and loose pulleys and clutch. "Z" blades.

1 Ditto Power-tilted Trough, 30 in. by 20 in. by 24 in. Pulley drive and clutch. Four "L" blades.

THOMPSON & SON (MILLWALL), LTD., LONDON, E.14.

TEL.: EAST 1844.

TWO Torrance 6' **EDGE RUNNER MILLS** & one 8' by Cox.

GARDNER MIXER, trough 17' x 8' x 8'. Two **GARDNER SIFTER/MIXERS** size "H" and one "G" **FILTER PRESSES**, C.I. and Wood.

Two Scott **S.E. EVAPORATORS** with Pumps & Motors. **MIRACLE MILLS**, sizes 1, 2 and 4W.

No. 1 motorised **KEK Mill**, pin disc type.

RICHARD SIZER, LTD., HULL.

Tel. HULL CENTRAL 31743

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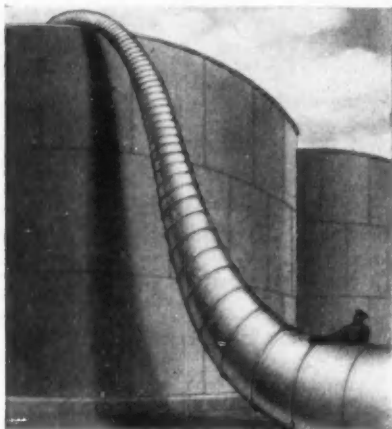
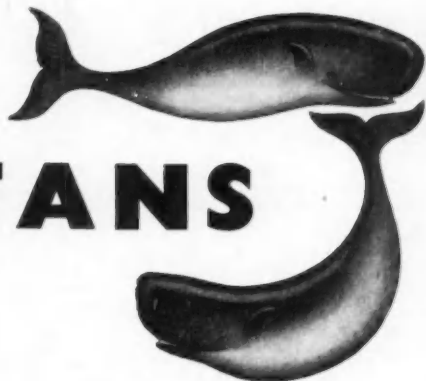
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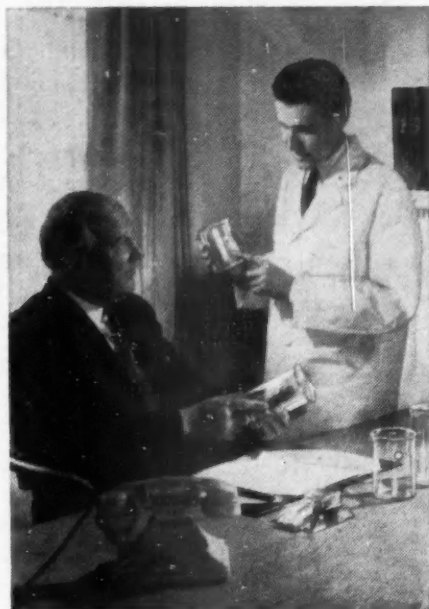
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